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(54) Title: A PROCESS FOR THE CLEANING AND PROTECTION, INCLUDING CORROSION PROTECTION, PRESERVATION AND DISINFECTION, OF SURFACES, AND AN AGENT FOR USE IN THE PROCESS

(57) Abstract

By a process for the cleaning and protection, including corrosion protection, preservation and disinfection, of all surfaces subjected to daily, periodic or current cleaning, and which between treatment and cleaning may be exposed to water having pH < 9, the cleaned surfaces are applied with a substance - preferably a plastic polymer - forming a dense, aseptic and water insoluble film, on which all dirt types can settle. The film is removed by wash with water having pH ≥ 9, whereby also the dirt settled on the film is removed. Thereafter the surfaces may be applied with a new film. Hereby it is possible without use of aggressive chemicals, hot water and pressure equipment, and without risk of build-up of resistant bacteria, in a very short time to perform cleaning and protection of rooms and equipment. Savings on water, energy, cleaning agents and personnel are obtained, and both internal and external environment are spared.

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A process for the cleaning and protection, including corrosion protection, preservation and disinfection, of surfaces, and an agent for use in the process

The present invention relates to a process of the kind stated in the introductory portion of claim 1 for the cleaning and protection, including corrosion protection, preservation and disinfection of surfaces, e.g. in undertakings and institutions in the food and pharmaceutical industries and in hospitals. The process according to the invention is directed at both production rooms and furniture and equipment. The invention also relates to an agent for use when carrying out the process.

For daily, current and periodic cleaning of production rooms, including machinery, equipment and furniture, e.g. in the food and pharmaceutical industries, use is mainly made of foam cleaning followed by disinfection. By the foam cleaning the surfaces to be cleaned are typically first coarsely washed with hot or cold water under pressure (typically 20-120 bar) in view of removing all loose and water soluble dirt. Then the surfaces are foamed with a cleaning agent having a loosening effect on dirt debris, typically in 5-15 min, and which may basic, neutral or acidic depending on the dominating type of dirt. The surfaces are then cleaned with hot or cold water under pressure (typically 20-120 bar) in order to remove debris of dirt and cleaning agent, and finally the cleaned surfaces are disinfected with hot water (above 80°C) or with chemical disinfectants (hypochlorites, peroxides, peracetic acid, quaternary ammonium compounds or the like). This disinfection may optionally be succeeded by a surface treatment with liquid paraffin. All these process steps are usually performed manually by cleaning staff, but the disinfection process may be performed automatic-

ally by means of atomizers.

Such processes for required daily, current and periodic maintenance of the hygiene level are, however, very time-consuming, costly and environmentally unfriendly. Furthermore, they are non-reproducible and often also inadequate in view of achieving a hygiene level fulfilling the high demands today placed on the hygiene of surfaces, in particular within the food, beverages and tobacco industries, in hospitals and the like places. In such places any contamination constitutes a risk of existence and growth of bacteria, fungi and other microorganisms, whose presence is undesired, i.a. because of the risk of contamination of raw and finished products.

The cleaning technology used today for maintaining the desired hygiene level of surfaces in e.g. food processing undertakings and the like places is - irrespective of the selected cleaning type - attached with very essential disadvantages and costs, among which in particular the following should be mentioned:

1. The technology is time-consuming because the daily cleaning and disinfection often takes 5-8 hours, in which period the production apparatus cannot be used.

2. The technology is costly which goes for both direct costs (for paying cleaning staff and for energy and water consumption) and indirect costs (in the form of environmental impact caused by the cleaning).

3. The technology is environmentally unfriendly both as regards working environment and surrounding environment because large amounts of deleterious chemicals are used and because water and energy consumption are large.

4. Finally, the traditional cleaning technology, such as foam cleaning, is insufficient in view of ensuring clean production rooms, which entails a very substantial risk of health hazardous and low durability products.

Thus there is a very large need for new processes with which it is possible quickly, uniformly and in a completely reproducible way to ensure that the daily cleaning results in clean and germ-free production conditions at a minimum of costs.

By the process according to the invention there is obtained a surprisingly simple, fast, cheap and reliable process whereby this object can be fulfilled.

More specifically, the invention relates to a process for the protection (including corrosion protection, preservation and disinfection) and cleaning of all surfaces subjected to daily, periodical or current cleaning and which between treatment and cleaning are or may be exposed to water and aqueous solutions, such as all external and internal surfaces in the food industry, wet-room surfaces, transport materiél, furniture, equipment and the like. The process according to the invention is thus usable for all surfaces which are cleaned daily, currently or periodically, and where the surfaces between treatment and cleaning are not exposed to basic solutions (pH ≥9) or solutions containing solvents which without the presence of base are capable of dissolving the applied plastic film. Thus, the process according the invention is characterized in that the cleaned surfaces are coated with a substance forming a dense, aseptic and water insoluble plastic film on which all kinds of dirt can settle and which subsequently is removable by washing with water

adjusted to pH ≥9 or with any other liquid having dissolving effect, whereby also the dust settled on the film is removed.

The invention is based on the recognition that if all surfaces in e.g. production rooms, including surfaces of equipment and furniture, are completely clean and prior to the start of production have been applied with a substance which is chemically inert and non-toxic and which forms a dense, water insoluble, protective and germ-free film on the surfaces, which film is easily removable by means of water having a pH-value of 9 or more or other aqueous solutions capable of dissolving the film, then the surfaces will be aseptic at the start of production. Contaminations of any kind which are settled on the surfaces can then be removed after the production merely by washing with water adjusted to pH ≥9 or with any other aqueous solution capable of dissolving the film. The film-forming substance may be applied automatically by means of any kind of suitable atomizer, while the washing with pH-adjusted water is preferably performed manually. Also the pH-adjusted water can, however, be applied automatically, whereafter washing is with clean water. Hereby the cleaning will be extremely simplified in comparison with the known technique, and the production surfaces will after cleaning be aseptic and germ-free.

The cleaning of the surfaces with pH-adjusted water is performed solely by washing irrespective of the contamination type, and there are no special demands on pressure, temperature or other parameters. However, the pH-value of the water must be adjusted to at least 9 or else the water must be added with chemicals capable of dissolving the film. Hereby the film and the dirt thereon loses its adhesiveness to the surface which is thereafter completely clean. Then a new water insoluble, dense film is applied

by means of an automatic atomizer or by any other application method.

In this way it is made possible to perform the daily, current or periodic cleaning very quickly without using anything else but water and a non-toxic chemical, without using pressure cleaning equipment, without unfortunate impacts on users, surfaces and environment, and with simultaneous attainment of clean, aseptic surfaces.

Danish patent application No. 2894/77 discloses a process for the protection and cleaning of surfaces exposed to soiling. The thus known process, however, involves surface treatment with water soluble agents, and it is consequently only usable for protection of hydrofobic, oily dirt on surfaces which moreover not before the cleaning are influenced by water or aqueous solutions. Contrary hereto, the process according to the invention involves a surface treatment for the protection of the surface against both hydrofobic and hydrophilic dirt, the surface being applied with a water and oil insoluble film. Therefore the process according to the invention is usable on surfaces which between application of the plastic film and cleaning are exposed to water, which e.g. is so within the food industry.

Also from Japanese public disclosure No. 78/108121 (cf. Chemical Abstracts vol 93 (1980) No. 27894b) is it known to coat solid objects with a substance forming a protective film which after soiling can be dissolved with water, whereby the object is cleaned. Thus the Japanese specification discloses a process where the object is first coated with a polyvinyl alcohol film and thereafter soiled with vegetable oil. By submerging the soiled object in water (20 °C) for 7 min the film becomes removable.

However, the thus known process is not usable for cleaning surfaces in food processing undertakings or other surfaces which in between treatment and cleaning are exposed to water, since polyvinyl alcohol is water soluble. It is not possible either to use polyvinyl alcohol on surfaces getting into contact with foodstuffs since polyvinyl alcohol is not approved for contact with foodstuffs. The method known from the Japanese disclosure is furthermore only usable on objects having such restricted size that they can be submerged or washed for the period required for dissolving the film.

The surface treatment performed by the process according to the invention furthermore results in an aseptic film whereby the treatment causes a disinfection. Besides, the film used can be employed in connection with foodstuffs. These properties appear neither from Danish patent application No. 2894/77 nor from Japanese public disclosure No. 78/108121.

The film-forming agent used by the process according to the invention can be any substance of a mixture of such substances which by application to cleaned surfaces form a dense film which is not dissolved by water at pH-values below 9, which are dissolved by water at pH-values of 9 or more or other aqueous solutions, and which can be approved in connection with food.

A number of substances are known having this desirable combination of properties. The agent most preferred for use in the process according to the invention is a plastic polymer, e.g. in the form of a combination of maleate resin and polyethylene.

Plastic polymers having the above properties are moreover

either pure polymer dispersions like e.g. a combination of acrylates and polyethylene or the above combination of polyethylenes and montan wax. The reason why plastic polymers after drying (film-formation) are removable with base is either (1) that the plastic polymer in its chemical composition contains free acid groups which by neutralization with base entails reduced adhesiveness to surfaces and/or dissolution of plastic structures, or (2) that the plastic polymer is water soluble because of the base content (e.g. ammonia), which during drying and film formation evaporates, since the plastic polymer by reaction with base subsequently can be made water soluble again. In the latter case the aqueous solution of the plastic polymer is basic because of the ammonia content, but neutral or acidic following film-formation because of evaporation of ammonia. This pH-shift can, by addition of an acid/base colour-indicator, such as e.g. phenolphthalein (colourless at pH <8.2-9.8, and red at pH >8.2-9.8) to the plastic polymer solution, if pH is more than 9, be used for controlling whether the application is correct on all surfaces (the applied solution being bright red), whether a plastic film is present on all surfaces (the film turning red by contact with base) and whether all surfaces are cleaned correctly (the film turning red by cleaning with a basic solution (pH >9)). Thus it is possible in a simple way to control all steps in the cleaning, including controlling the presence of plastic film at all times, also during the production.

The above combination of polyethylene and maleate resin is preferred because it is extremely suited for the purpose: Thus it has been approved in connection with foodstuffs, and it has high adhesiveness and large anti-release effect. Furthermore it is completely waterproof and has a high dirt-repellent capability, and is also extremely wear resistant. The toxicity is negligent, and the agent

contains no phosphate, is not marked hazardous and is biodegradable.

The polymers mentioned in Danish patent application No. 2894/77, such as cellulose, starch, polyethylene glycols and polyvinyl alcohol, only serve as thickeners in view of obtaining a certain viscosity. All these polymers are water soluble and consequently cannot be compared with the water insoluble plastic polymers used by the process according to the invention.

Since the process according to the invention does not employ strong chemicals, including disinfectants, there is no risk of build-up of resistant bacteria chemically.

The film-forming agent can be applied automatically in closed rooms by means or aerosol nozzles. Advantageously use can be made of an atomizer of a type the nozzles of which are capable of atomizing with a particle size of less than 3 µm, whereby it is achieved that the particles can be distributed with the ordinary room air. Hereby it e.g. is possible to shroud a room of 800 m^3 in a completely dense fog in a few minutes using less than 10 litres of liquid. Even complicated production equipment with surfaces which are either difficult to access or hidden can be treated effectively in this way. An atomizer of this type is today commonly used for e.g. air-moistening and room-disinfection.

It is also possible to apply the film-forming agent manually, e.g. by means of form equipment or sprayer.

The process according to the invention employs pH-adjusted water for the cleaning. The required pH-adjustment to pH ≥ 9 can be performed with any chemical providing alkaline reaction in the pH-area ≥9. Chemicals, such as e.g. sodium

hydroxide, potassium hydroxide and metasilicates, are thus usable.

The advantages of the process according to the invention are evident, since hereby it becomes possible to perform cleaning and maintenance of production rooms and other surfaces

1) Without use of aggressive chemicals.
2) Without use of hot water.
3) Without use of pressure equipment.
4) With surface protection of belts and the like.
5) With corrosion protection of metal surfaces.
6) In a very short time.
7) Independently of dirt occurence and type.
8) Without risk of build-up of resistant bacteria.

The advantages attached to the process according to the invention entail considerable reductions as regards both staff and resources, more specifically:

1) Water savings
2) Energy savings
3) Improved working environment
4) Reduced sewage pollution
5) Personnel reduction
6) Reduced consumption of cleaning chemicals.
7) No use of disinfectants.
8) Easier cleaning and reduced cleaning time.
9) Improved hygiene (aseptic surfaces).
10) At the most two cleaning or maintenance agents.

The process according to the invention is usable in combination with all kinds of periodic cleaning of surfaces, such as foam cleaning, manual cleaning, circulation cleaning, cleaning of transport equipment, in

washing machines, when cleaning containers etc.

The invention is described in more detail by the following example.

EXAMPLE

In a food processing plant within the fishing industry the process according to the invention was used instead of traditional cleaning and disinfection, and thereafter it was evaluated whether on the following day the cleaning was easier. Also the treated surfaces were examined microbiologically.

The surfaces were cleaned with an alkaline (pH >9) cleaning agent (2%) after coarse washing with water. Thereafter a plastic polymer of the preferred type in a 2.5% solution was applied on all surfaces by means of atomizing equipment. Because of the indicator added to the polymer solution it was immediately detectable whether all corners had been reached, since the solution was red when being applied. After drying the red colour disappeared. The cleaning control was performed the next morning.

The hygiene measurements were based on germ count on sampled specimens, and the hygiene was assessed according to a point system as follows:

Number of colonies	0-2	3-31	32-100	>100
Point	0	1	2	3

A point value of 2 or more indicates that the cleaning was insufficient.

In all cases, i.e. at all sampling points, the colony number, however, was below 1, which gives 0 point. That is, the cleaning was in all cases most satisfactory.

The later cleaning after intermediate production also appeared to be much easier. Thus, there was not as much dirt as usually, and after foaming the coating was much easier to remove than normally. During the cleaning after production it was thus possible by means of pH-adjusted water (pH >10) to establish that the coating had not been worn off during the production, since the indicator in the film had turned red again.

C l a i m s :

1. A process for the cleaning and protection, including corrosion protection, preservation and disinfection of surfaces, e.g. surfaces in undertakings and institutions which are cleaned periodically and between protection and cleaning may be exposed to water having pH <9, c h a r - a c t e r i z e d in that the cleaned surfaces are applied with a substance forming a dense, aseptic and water insoluble plastic film, on which all dirt types can settle, and which can be removed by wash with water adjusted to a pH-value of 9 or more or with any other liquid having dissolving effect, whereby also the dirt settled on the film is removed.

2. A process according to claim 1, c h a r a c t e r - i z e d in that the substance applied onto the cleaned surfaces is selected from plastic polymers, including plastic polymers approved for use in connection with foodstuffs.

3. A process according to claim 1 or 2, c h a r a c - t e r i z e d in that the applied plastic film can be visualized with base by means of an indicator being invisible in the plastic film, but visualizable in basic media.

4. A process according to claim 1, c h a r a c t e r - i z e d in that the washing with pH-adjusted water takes place automatically, followed by washing with clean water.

5. A process according to any of the claims 1-4, c h a r a c t e r i z e d in that the substance forming a dense, aseptic and water insoluble film, is applied automatically in closed rooms by means of aerosol nozzles,

preferably nozzles capable of vaporizing with a particle size less than 3 µm.

6. A process according to any of the claims 1-3, c h a r a c t e r i z e d in that the substance forming a dense, aseptic and water insoluble film is applied manually by means of foam equipment, sprayer or other equipment.

AMENDED CLAIMS

[received by the International Bureau on 24 August 1992 (24.08.92) ; original claims 1-6 replaced by amended claims 1-6 (2 pages)]

1. A process for the cleaning and protection, including corrosion protection, preservation and disinfection of all forms of surfaces in the food industries, which are cleaned periodically, and which may be exposed to water having a pH <9 between protection and cleaning, c h a r a c t e r i z e d by cleaning the surfaces with pH-adjusted water (pH ≤9), and then, to protect the cleaned surfaces, applying to these a film of a plastic polymer approved for use in connection with foodstuffs and forming a dense, aseptic and water-insoluble plastic film on which all dirt types can settle, and which can be removed by washing with water adjusted to a pH value of 9 or above or with any other liquid having a dissolving effect, whereby also the dirt settled on the film is removed, and visualizing the applied polymer film by means of an indicator, which is invisible in the plastic film, but visible in a basic media, e.g. phenolphthalein.

2. A process according to claim 1, c h a r a c t e r i z e d in that the washing with pH adjusted water takes place automatically, followed by washing with clean water.

3. A process according to claim 1 or 2, c h a r a c t e r i z e d in that the plastic polymer, which forms a dense, aseptic and water-insoluble film, is applied automatically in closed rooms by means of aerosol nozzles, preferably nozzles capable of vaporizing with a particle size below 3 µm.

4. A process according to claim 1, c h a r a c t e r i z e d in that the plastic polymer, which forms a dense, aseptic and water-insoluble film, is applied manually by means of foam equipment, sprayer or other equipment.

5. An agent for use in the process according to claim 1, c h a r a c t e r i z e d in that it is a plastic polymer approved for use in connection with foodstuffs, preferably a combination of acrylates and polyethylene in about 30% aqueous solution.

6. An agent according to claim 5, c h a r a c t e r - i z e d in that the solution is diluted 5-50 times with water before use.

INTERNATIONAL SEARCH REPORT

International Application No PCT/DK 92/00096

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: B 05 D 5/00, B 08 B 17/04, C 23 F 11/00

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	B 05 D; B 08 B; C 23 F

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in Fields Searched[8]

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	EP, A1, 0371378 (HENKEL KOMMANDITGESELLSCHAFT AUF AKTIEN) 6 June 1990, see page 2, line 14 - line 17; page 2, line 31; page 3, line 55 - line 56 --	1-6
X,P	EP, A2, 0468244 (RUDOLF WILD GMBH & CO INTERNATIONAL KG) 29 January 1992, see column 2, line 14 - line 58; column 3, line 10 - line 39 --	1-6
Y	SE, B, 462319 (BIOBOAT AB) 11 June 1990, see page 1, line 28 - page 2, line 3; page 4, line 18 - line 24 --	1,2,4-6

* Special categories of cited documents:[10]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
25th June 1992	1992 -06- 29
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	Margareta Jonason

Form PCT/ISA/210 (second sheet) (January 1985)

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
Y	EP, A1, 0405341 (HENKEL CORPORATION) 2 January 1991, see page 2, line 38 - line 55; page 4, line 20 - line 41 --	1-6
Y	DE, B2, 2723493 (UNILEASE S.A.) 22 May 1980, see column 2, line 27 - line 32; column 4, line 11 - line 58 --	1-6
Y	EP, A1, 0014597 (STERWIN AG) 20 August 1980, see page 2, line 10 - page 3, line 14; page 5, line 8 - line 16 --	1-6
A	SE, B, 422953 (NORDTEND AB) 5 April 1982, see page 2, paragraph 3; page 3, paragraph 3; page 5, paragraph 5 --	1-6

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. PCT/DK 92/00096

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 29/05/92
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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A1- 0371378	90-06-06	CA-A-	2003986	90-05-26
		DE-A-	3839935	90-05-31
		EP-A-	0445216	91-09-11
		WO-A-	90/06344	90-06-14
EP-A2- 0468244	92-01-29	DE-A-	4023909	92-01-30
SE-B- 462319	90-06-11	AU-B-	612163	91-07-04
		AU-D-	1958888	89-01-19
		AU-D-	1959288	89-01-19
		CA-A-	1294182	92-01-14
		EP-A-B-	0365584	90-05-02
		EP-A-	0366704	90-05-09
		JP-T-	2503881	90-11-15
		JP-T-	2503927	90-11-15
		SE-A-	8704589	88-12-18
		US-A-	5017237	91-05-21
		US-A-	5093485	92-03-03
		WO-A-	88/10156	88-12-29
		WO-A-	88/10284	88-12-29
EP-A1- 0405341	91-01-02	AU-D-	5775290	91-01-03
		CA-A-	2019750	90-12-26
		CN-A-	1048870	91-01-30
		JP-A-	3056170	91-03-11
DE-B2- 2723493	80-05-22	AT-B-	373794	84-02-27
		BE-A-	867438	78-09-18
		CH-A-	621071	81-01-15
		FR-A-B-	2391784	78-12-22
		GB-A-	1604562	81-12-09
		LU-A-	79698	78-11-06
		NL-A-	7805662	78-11-28
		SE-B-C-	438322	85-04-15
		SE-A-	7805937	78-11-26
EP-A1- 0014597	80-08-20	NONE		
SE-B- 422953	82-04-05	CH-A-	632171	82-09-30
		DE-A-	2728464	78-01-05
		SE-A-	7607474	77-12-31